**CLIMATE NARRATIVE, January 2020 and as noted**

**UNITED STATES WEST COAST AND NORTH PACIFIC**

During late January 2010 US west coast (20-150 km offshore) satellite derived sea surface temperatures ($SST_J$) were 9°-11°C north of 45°N, 11°-13°C south of 45°N to 39°, 11°-15°C south of 39°N to 33°N and 14°-18°C south of 33° to 28°N in patterns similar to those found during late December. $SST_J$ anomalies were weakly negative (≥-1°C) along the west coast of North America from 33° to 60°N, with similar conditions extending 2,000 km offshore between 20° and 40°N. An area of positive $SST_J$ anomaly (≤2.5°C) spread over millions of $km^2$ of the central Pacific. One branch extended from 20°-30°N, 155-175°W southwest to include an area centered near the intersection of the date line (180°) and the equator. The other branch extends intermittently westward to the coasts of Japan, Korea and China between 30°-50°N.
https://www.ospo.noaa.gov/Products/ocean/sst/anomaly/
https://coastwatch.pfeg.noaa.gov/elnino/coastal_conditions.html (current)
https://coastwatch.pfeg.noaa.gov https://climatereanalyzer.org/wx/DailySummary/#sstanom (current)
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ocean/weeklyenso_clim_81-10/wksl_anm.gif
https://www.ospo.noaa.gov/Products/ocean/sst/contour/index.html

Late January, **sea level height anomalies** (SLA), -15 to 25 cm, appeared in areas reaching zonally across the North Pacific. The largest Pacific Ocean positive SLA (≤25 cm) extended from 140°W to120°E north of 30°N. Weak negative SLA anomaly (≥ -10 cm) was east of this area. A zonal area of negative SLA extended across the entire North Pacific between 7°N and 20°N in patterns observed since November. West of 150°E, negative SLA anomaly extended from 20°N southward across the equator. Some of the largest US west coast tidal excursions of 2020 occurred during 10-15 January, part of a global phenomenon.
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ocean/weeklyenso_clim_81-10/wksl_anm.gif (current)
https://wsg.washington.edu/community-outreach/hazard-resilience-and-climate-adaptation/king-tides/calendar/
https://www.msq.qld.gov.au/Tides/King-tides

Composite January **satellite imagery** of the US west coast showed surface **chlorophyll-a** (chl-a) at 0.2- 1.2 $mg/m^3$ in coastal bands and plumes alongshore from 33°N, off the upper Southern California Bight (SCB), to southern OR (43.0°N). These bands extended 200-700 km seaward. Month-to-month comparison suggests winter-time downward trends in surface layer chl-a concentration. Off the lower SCB and northern Mexico, bands of similar concentration extended 100-200 km seaward. Greater concentrations occurred in smaller inshore areas. Offshore, chl-a concentrations were near 0.1 $mg/m^3$ south of 44°N and was 0.1-0.7 $mg/m^3$ across the Pacific north of 44°N. Derived chl-a surface layer concentration variability may depend variously on ocean conditions, satellite sensors and averaging techniques.
https://coastwatch.pfeg.noaa.gov/coastwatch/CWBrowserWW180.jsp#
https://coastwatch.pfeg.noaa.gov/erddap/griddap/erdVHNchla8day.graph?chla[(2020-01-30T00:00:00Z)][(0.0)][(83.65125):(-0.10875)][(-193.76625):(-110.00625)]&.draw=surface&.vars=longitude%7Clatitude%7Cchla&.colorBar=%7C%7C%7C%7C%7C%7C&.bgColor=0xffccccff
https://www.star.nesdis.noaa.gov/sod/mecb/color/ (current)

**Lists of monthly sea temperature at shore and near-shore buoys**

Shore and nearshore water temperature measurement locations are given in decreasing latitude. Each line begins with latitude followed by a shore station or buoy abbreviation. Temperature values are in brackets with the average of available monthly values first (followed by the range) in parens. Averages for the (first, second and third)

temporal thirds, respectively, are within the second parens, followed by the multiyear monthly average, where available. Subscripts H and L indicate the third when Highest and Lowest temperatures were recorded.

**List (January 2020)** **Amphitrite Point, B.C. 48.9°N**

Neah,48.5°N,124.7°W [8.9(7.6-9.8)(9.0,8.6$_L$,9.2$_H$) 8.1°C]

**Cape Flattery 48.4°N**

*NeBy,48.4°N* *[8.3(6.6-9.3)(8.4, 7.8$_L$,8.7$_H$)°C]*

CpEz,47.4°N,124.7°W [9.8(8.6-10.3)(10.0$_H$,9.5$_L$,10.0)9.0°C]

TlMk,46°N,125.8°W [9.8(9.3-10.5)(10.3$_H$,9.5$_L$,9.5)9.9°C]

**Cape Blanco 42.8°N**

*PrtO,42.7°N* *[10.6(9.5-11.5)(10.7,10.2$_L$,10.9$_H$°C)]*

*CCty,41.7°N* [10.4(8.7-11.2) (10.7,9.9$_L$,10.7$_H$°C)]

EelR,40.7°N,124.5°W [11.4(10.0-12.3)(11.7$_H$,11.3$_L$,11.3)11.3°C]

**Point Arena 39°N**

*ArCv,38.9°N* *[11.4(10.3-12.3)(11.4,11.0$_L$,11.9$_H$°C)]*

**Point Reyes 38°N**

SFrn,37.8°N,122.8°W [12.3(11.6-13.3)(12.6$_H$,12.0$_L$,12.3)11.6°C]

*Mtry,36.6°N* *[13.3(12.2-14.1)(13.7$_H$,12.9$_L$,13.4°C]*

*PrtS,35.1°N* *[13.4(12.3-14.2)(13.5,12.8$_L$, 13.8$_H$°C)]*

PtCn,34.5°N,120.8°W [14.4(13.1-15.0)(14.3, 14.4,14.3$_{LH}$°C)]

**Point Conception,34.4°N**

SBCh,34.3°N,119.9°W [14.9(13.1-15.9)(15.2,14.4$_L$,15.0$_H$)13.9°C]

*Smca,34°N* [15.3(14.5-16.2)(15.3$_L$, 15.1, 15.4$_{LH}$°C)]

Tory,32.9°N,177.4°W [14.7(14.1-15.8)(14.8,14.6,14.7$_{LH}$°C)]

*LaJo,32.9°N* *[15.6(14.8-16.3)(15.6$_{LH}$, 15.5, 15.6)°C]*

**Point Loma, 32.7°N**

Shore measurements, taken at fixed depth below the lowest tide at NOAA **tide stations**, are indicated by: *NeBy* (9443090), *PrtO* ( 9431647), *CCty* (9419750), *ArCv* ( 9416841), *Mtry* (9413450 ), *PrtS* (9412110), *Smca* (9410840), *LaJo* (9410320) in. (Numbers) lead to detailed location and station descriptions,
https://tidesandcurrents.noaa.gov/stations.html?type=Physical%20Oceanography. Near shore buoy measurement details are obtained from number designations: Neah (46087 ), CpEz (46041),TlMk

(46089),EelR (46022), SFrn (46026), PtCn (46218), SBCh (46053), Try (46225 ).
https://www.ndbc.noaa.gov/station_page.php?station=46087 (exchange buoy number in http)

**EQUITORIAL AND SOUTH PACIFIC** (late January and as noted)

Models suggest that current El Niño-neutral conditions will persist. Positive SSTJ anomaly (≤2°C) extended across the Equatorial Pacific (EP) during December, but in January negative SSTJ anomaly appeared east of 120°W. Largest EP SSTJ anomalies remained near 180°E/W and this anomalous area extended northeast as far as 35°N. Positive EP subsurface temperature anomalies (≤2.5°C) increased above 150 m depth between 170°W and 160°E and above 60 m east of 100°W. Eastern EP upper 300 m heat content anomaly persisted positive through January. Night-time satellite imagery indicated two areas (≥700,000km$^2$) of negative SSTJ anomaly. The largest was centered near 20°S, 100°W and the second occurred south of Australia extending toward the Antarctic ice edge. Less extensive areas of negative anomaly were observed near 40°-60°S, 120°-150°W and north of New Zealand. An undulating band of mainly positive anomaly (≤2.5°C) was observed along the east coast of Australia and extended eastward to 180°-160°W, 60°-40°S, then northeastward to 80°-120W, at 33°-40°S.

**Sea level height anomaly** (SLA) was negative (≥-15cm) along the eastern Pacific boundary from 35°S to 10°N. This area extended west to 125°W at 10°S. At the western boundary, negative anomaly occurred from Australia to the Sea of Japan (20°S-40°N) and was continuous with areas southeastward and across the south Pacific at 10°-25°S. Positive SLA (≤10 cm) was typical of the EP at the date line and south to 10°S. SLA was positive (≤10 cm) east of Australian coastal waters, extending to 140°W.
http://www.ospo.noaa.gov/Products/ocean/sst/anomaly/
https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ocean/weeklyenso_clim_81-10/wksl_anm.gif
https://www.ospo.noaa.gov/Products/index.html

The NOAA **Oceanic El Niño Index** (ONI) (3-month running mean of SST anomalies in the Nino 3.4 region) increased to 0.5 for October-November-December (OND) and 0.6 for NDJ giving two consecutive El Niño-like values.
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf
https://climatedataguide.ucar.edu/climate-data/multivariate-enso-index (alternate El Niño index)

The January NOAA/NCEI **Pacific Decadal Oscillation Index** (PDO), calculated from ERSST.v4 was -1.17, was the largest magnitude value since May 2016 (PDO=1.5).
https://www.ncdc.noaa.gov/teleconnections/pdo/ ,
http://research.jisao.washington.edu/pdo/PDO.latest.txt

The **Pacific / North American Teleconnection Index** (PNA), computed from atmospheric pressure over the Pacific Ocean and North America had near neutral January daily values, except for a negative excursion during mid-month. The January monthly mean value was -0.24. https://www.cpc.ncep.noaa.gov/data/teledoc/pna.shtml (computational alternatives).

January monthly ERD/SWFSC coastal **Upwelling Indices** (UI) showed downwelling conditions, negative UI, for the 42°-60°N computation points. UI anomaly was also negative, from 42°N to 46°N and positive from 51°N to 60°N indicating stronger and weaker than average, respectively, cyclonic winds,. Weakly positive UI and UI anomaly were computed for 24°-39°N. (note computational alternatives).
https://upwell.pfeg.noaa.gov/products/PFELData/upwell/monthly/table.2001

Daily UI values for 36°N were positive, except for weakly negative values during 15-20 January. At 36°N moderate UI values were found for 1, 4, 5, and 29 January.
https://oceanwatch.pfeg.noaa.gov/products/PFELData/upwell/daily/p10dayac.all
https://oceanview.pfeg.noaa.gov/products/upwelling/dnld (current)

**PRECIPITATION and RUNOFF** (late January)

Southwestern Canada, Washington, Oregon, and northern California had several inches of rain during January. Western WA rain-year totals were near or above normal in late January. Seasonal precipitation totals remained lower than average throughout OR. Northern California received more than 2 inches (50 mm) of precipitation in late January, but there was little precipitation in Central and Southern California. California Sierra snowpack, was 74% of late-January averages. https://droughtmonitor.unl.edu.
https://www.cpc.ncep.noaa.gov/products/global_monitoring/precipitation/global_precip_accum.shtml

Highly variable **Fraser River** discharge, measured in late January at Hope (130 km upriver from **Vancouver, B.C.),** was 1,280 $m^3/s$ (45,200 cubic feet /sec or cfs). The late January multi-year median for Hope is 850 $m^3/s$. https://wateroffice.ec.gc.ca

**Washington State River Discharge**

The **Puyallup** at Puyallup was flowing at 7,820 cfs [2,760 -historical median as cfs in brackets]. **Skagit** flow was 30,900 [14,900 cfs] near Mount Vernon. **Stillaguamish** discharge was 12,100 [1,580 cfs] at Arlington. **Columbia** transport was 196,000 [187,000 cfs] at Vancouver.

**Oregon River Discharge**

The **Columbia** at the Dalles, was 155,000 [120,00 cfs], The **Wilson** at Tillamook, was flowing at 4,520 [1,280 cfs]**.** At Elkton, **Umpqua** transport was 19,800 [10,800 cfs]. **Rogue R.** flow was 3,680 [3,459 cfs] at Grants Pass and 9,220 [6,590 cfs] at Agness.

**California River Discharge**

The **Klamath,** near Klamath, was transporting 30,200 [22,700 cfs]. **Smith** R. discharge was 8,170 [4,980 cfs] near Crescent City. The **Eel** at Scotia had 9,420 [10,400 cfs] transport. At **Battle Creek,** Coleman National Fish Hatchery the flow, was 424 [489 cfs]. **Butte Creek** at Chico had 338 [395 cfs] transport. **Sacramento R.** transport was 18,100 [27,300 cfs] at Verona and 22,400 [31,900 cfs] at Freeport. **San Joaquin** flow was 2,040 [2,839 cfs] at Vernalis. **Pescadero Creek** transport was 11 [28 cfs] near Pescadero. **San Lorenzo R.** discharge was 94 [95 cfs] at Santa Cruz. The **Pajaro** at Chittenden was flowing at 56 [74 cfs]. The **Salinas R.** near Spreckels had no measurable flow [41 cfs]. The **Carmel R.** at Carmel was flowing at 70 [112 cfs]. The **Big Sur R.** near Big Sur, CA discharged at 65 [112 cfs]. https://waterdata.usgs.gov/ca/nwis/current/?type=flow
https://www.cnrfc.noaa.gov/awipsProducts/RNOWRKCLI.php= (current)
https://wateroffice.ec.gc.ca/search/real_time_results_e.html
https://www.cpc.ncep.noaa.gov/products/global_monitoring/precipitation/global_precip_accum.shtml
https://www.nwrfc.noaa.gov/water_supply/wy_summary/wy_summary.php?tab=5

**Notes**

Total California landings of **Coastal Pelagic Species** during 2019 was low

compared to past years. A total of 27,991 metric tons of Pacific Mackerel, Jack Mackerel, Pacific Sardine, Northern Anchovy and Market Squid were sold in California ports. The species percent of the total was [13, 0, 6, 36, 44%], respectively. During 2015 the respective catches were [9, 2, 3, 28, 59%] of 62,558 mt and in 2001 the respective catches were [4, 2, 31,11, 51%] of 168,103 mt. Market Squid were the largest percentage landed in each of these three years and anchovies were second largest catch in 2015 and 2019. Largest part of the Northern Anchovy landings (≥60%) were brought into ports north of Point Conception. Pacific Sardines were the second largest catch in 2001. General decline in total catch is due to species availability, ex-vessel value and ongoing regulations. Catches of Pacific Mackerel, Pacific Sardines and Northern anchovies for live bait in southern California recreational fisheries are not included.
https://wildlife.ca.gov/Conservation/Marine/Pelagic/Landings

**Columbia Basin anadromous fish return** forecasts are used in adaptive management for stakeholders and conservation. During 2019 over all salmonid return was below predictions. Spring chinook adults migrated into the Willamette River and tributaries (27,292--2019 return estimate) at 68% of forecast. Immature spring chinook (jacks) returned to the Willamette at near the five-year average (2022). Upriver Spring Chinook returned (73,101) at 74% of predicted, less than 50% of 10-year average. Total spring chinook return was estimated to be109,808. Upper Columbia Summer Chinook returned (34,619) at about 95% of forecast, lowest since 2000. Hatchery supported Bright Fall Chinook returned at about 113% of forecast and the bright jack count was highest since 2016. Tule Fall Chinook return counts were 76% of predicted. Total adult Columbia fall chinook returned (290,900) at 80% of predicted numbers. Total chinook adults and jacks returned (381,773 and 60,032) at 55% and 61%, respectively, of 10-year averages. Coho return was less than one third of forecast. Sockeye salmon returns (63,223) were about 67% of predicted and 72% of predicted in the Okanogan (54,300). Upriver Summer Steelhead tallied at 75,600, 60% of forecast and 27% of 10-year average. An estimated 7.7 million (M) shad *(Acipenser transmontanus)*, a species introduced in1876, entered the Columbia at 300% of 10-year average. An estimated 4.2 M pounds (1.9 M kg) of Euchelon (*Thaleichthys pacificus),* also known as "smelt," entered the Columbia River (66% of 10-year average). Pacific Lamprey (*Entosphenus tridentatus*) returned (19,374) at 56% of ten year average. https://www.fws.gov/gorgefish/ComplexOurSpecies.cfm https://www.nwcouncil.org/fish-and-wildlife/fw-forums-and-workgroups/science-policy-exchange/columbia-river-eulachon-smelt-state-of-the-science-and-science-to-policy-forum https://www.nwcouncil.org/news/2019-columbia-river-salmon-and-steelhead-runs-should-be-better-2018 https://www.critfc.org/fish-and-watersheds/columbia-river-fish-species/lamprey/ https://www.dfw.state.or.us/fish/OSCRP/CRM/index.asp

This and past Narratives may be found, https://coastwatch.pfeg.noaa.gov/elnino/coastal_conditions.html
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